

# Power loss interrupts otherwise normal operation on Mir

By John Lawrence

The recent period of relative tranquillity in Russian Space Station Mir operations was temporarily halted last week by a power loss in the Core Module.

About noon Friday, Nov. 14, during a test of the newly installed solar array on Kvant-1, a power loss resulted in the shutdown of the Motion Control System computer. Using Soyuz thrusters, the Mir crew kept the arrays pointed in a favorable direction for exposure to the Sun, and power was gradually restored it to the Core Module. Othe modules remained powered.

The Mir crew also encountered a minor problem repressurizing the exterior airlock of the Kvant-2 module following space walks on Nov. 3 and 6. Mir 24 Commander Anatoly Solovyev and Flight Engineer Pavel Vinogradov tightened clamps and latches around the circumference of the hatch during the second space walk, but the slow leak continued despite their efforts. The situation poses no danger to the station since the hatch door

on the science and instrumentation compartment behind the airlock is providing an air tight seal. Flight controllers on the ground will continue to assess the situation, and Russian Mission Control reports there will be no impact on the future space walks planned for early December and January.

The two events occurred during an otherwise routine environment on board Mir over recent weeks. NASA Astronaut David Wolf, in the third of a series of his e-mail "letters home", wrote ironically, "There's no place on Earth I would rather be." Wolf told of the regimen aboard the station and gave insight into the character of the ship. He described "...cockpit keys that look like worn ivory...metal machining of the highest quality... [and] leather shrouds where plastic would now be chosen."

Space walk maintenance tasks by the cosmonauts have restored Mir's power to near the levels which existed prior to the Progress collision in June. An aging and inefficient

solar array on the Kvant-1 module was removed and replaced with a new array, resulting in an immediate increase of 103 amperes. The Spektr solar array that initially was not accepting solar tracking commands can now be pointed toward the Sun by controllers on the ground. Although the solar array still does not track the Sun automatically, it does accept commands. For Solovyev, the excursions outside the Mir were the thirteenth and fourteenth space walks of his five tours of duty on the Russian outpost. He has conducted five space walks during this current mission. Vinogradov, in his first flight, has now conducted four space walks.

Solovyev and Vinogradov also performed routine maintenance on the urine recycling system. They replaced a pump on a technical cooling loop in the Kristall module, which provides cooling for the Optizon materials science experiment furnace.



Wolf continued his science activity involving several difference facilities and experiments. Last week he completed the Canadian Protein Crystallization Experiment, which analyzed the crystalline structure of 32 proteins in an effort to improve drug development and design. Half the samples were subjected to the micro-accelerations due to crew movement and hardware activities. The second half of the samples were placed on the Canadian Space Agency's Microgravity Isolation Mount. The MIM dampens or isolates the crystals from micro-accelerations. By comparing the growth of the two sets of crystals, scientists hope to learn more about the effects of micro-accelerations and the effectiveness of isolation on the growth of crystals.

Wolf is midway through his four-month mission which will end in January when he is replaced by U.S. astronaut Andy Thomas. Wolf will return to Earth in late January as part of that STS-89 crew. Solovyev and Vinogradov have been aboard Mir since Aug. 7 and are to return to Earth in February.



The crew of STS-87 arrives at Kennedy Space Center's Shuttle Landing Facility on Sunday. From left are Mission Specialists Winston Scott and Takao Doi, Commander Kevin Kregel, Payload Specialist Leonid Kadenyuk, Mission Specialist Kalpana Chawla and Pilot Steve Lindsey.

## Mission Control open for viewing during STS-87

The Mission Control Center viewing room will be open for JSC and contractor badged employees and their families during portions of the STS-87 mission.

Employees will be allowed to visit the MCC from 3-5 p.m. Nov. 21; 1-3 p.m. Nov. 22; 2-4 p.m. Nov. 23; 1-3 p.m. Nov. 24; 5-7

p.m. Nov. 25; 2-4 p.m. Nov. 26; 3-5 p.m. Nov. 27; 5-7 p.m. Nov. 28 and 29; 6-8 p.m. Nov. 30; 1-3 p.m. Dec. 1 and 2; 3-5 p.m. Dec. 3; and 10 am.-noon Dec. 4.

Employees must wear their badges and escort family members through the lobby of Bldg. 30 South. Children under five will not be per-

mitted. No cameras or recording devices will be permitted at any time. Because of the dynamic nature of shuttle missions, viewing hours may be changed or canceled without notice.

For the latest information on the schedule, call the Employee Information Service at x36765.

## Precourt to lead final shuttle-Mir docking flight

Astronaut Charlie Precourt, who has visited the Russian Space Station twice before, will command the final scheduled shuttle/Mir docking mission in May, concluding the joint U.S./Russian Phase 1 Program.

Precourt, JSC's acting assistant director, technical, and a U.S. Air Force colonel, will be joined on the flight deck by Pilot Dom Gorie, a Navy commander, and Mission Specialists Wendy Lawrence, a Navy commander; Franklin Chang-Diaz, Ph.D.; and Janet Kavandi, Ph.D.

Mission Specialist Andy Thomas, Ph.D., will join the STS-91 crew as he returns from a four-month

research mission on Mir. Thomas' departure from Mir will bring to an end more than two years of a continuous U.S. presence on Mir, beginning with Shannon Lucid in March 1996. Thomas will arrive as a member of the STS-89 crew.

STS-91 will mark Precourt's third mission to Mir and fourth shuttle flight. He was the commander for STS-84 in May 1997, the sixth docking mission that returned Jerry Linenger to Earth and delivered



Precourt

between the two spacecraft.

Chang-Diaz will be making his sixth journey into space, having flown on STS-61C in 1986, STS-34 in 1989, STS-46 in 1992, STS-60 in 1994 and STS-75 in 1996. With a doctorate in applied plasma physics, he will support a major scientific objective as he works with the Alpha Magnetic Spectrometer Investigation. The objectives are to search for anti-matter and dark matter in space and to study astrophysics.

## STS-87 features space walk to test International Space Station maintenance

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basic properties and behavior of various materials and liquids being flown in space. Knowledge gained from these experiments may help produce better semiconductors for complex computers and other high-tech electronics and could help produce stronger metal alloys sought by the aircraft and automobile industries.

Thursday afternoon, the crew was to have used the shuttle's mechanical

arm to deploy the Spartan 201 free-flyer, allowing it to begin independent observations of the hot outer layers of the Sun's atmosphere, or solar corona, and to gather measurements of the solar wind. Information collected during the flight will lead to a much better understanding of the solar winds that directly influence orbiting satellites and weather conditions on Earth which in turn impact television and phone communications.

Kregel and Lindsey will use maneuvering jets to maintain the proper distance between the orbiter and Spartan. *Columbia* will begin to close in on the free-flying observer just after noon Saturday. The final burn to put the orbiter on an intercept course will take place mid-afternoon with capture planned for about 6:30 p.m. Saturday.

Sunday's activities will center around preparing for the space walk to be performed by Scott and Doi. The

pair will spend Sunday preparing *Columbia's* airlock for the walk, checking out suits and configuring the tools they will use over six and a half hours in the payload bay. Lindsey will spend part of Sunday checking out the AERCam/Sprint robot camera that will be evaluated during the space walk.

Monday's EVA should begin at about 5:30 p.m. CST and will make history as Doi becomes the first Japanese astronaut to perform a

space walk, which will involve tasks originally planned for STS-80 in November 1996 that were not achieved due to a stuck airlock hatch. Activities will include an end-to-end simulation of an Orbital Replacement Unit changeout on the International Space Station. A crane designed for use in moving large ORUs on the space station also will be tested.

STS-87 is to land at KSC about 6:20 a.m. CST Dec. 5.

## Life support test crew sets record

Team passes 60-day mark with all systems working well

The four-person team testing space-age recycling methods in Bldg. 7 set a chamber duration record this week as it passed the 60-day mark.

"The life support systems continue to function very smoothly," reported Nigel Packham, commander of the Lunar-Mars Life Support Test Project Phase III crew, "and the four of us continue to be amazed at the level of effort the team is producing."

The highlight of the last couple of weeks was reaching the halfway point of the 90-day test. JSC Director George Abbey and other members of the senior staff were on hand to witness the "crossing of the line"—an imaginary point in time where you have less time to go than the time that has already passed," he added .

"Having spent 60 days on the outside and 30 on the inside in previous tests, I can say that it goes a great deal quicker on the inside,"

said crew member John Lewis. "I know that reaching the half-way point is a significant milestone in that control room." The test team was able to share the moment with the crew inside using a video camera and microphone set-up in the high bay of Bldg. 7. "The crew really appreciated the tremendous support shown by all the people who attended the halfway celebration," noted crew member Vickie Kloeris.

"From the systems point of view, we also reached a technical milestone at day 45," said Laura Supra, one of the two systems specialists in the chamber. "We switched over to a different system for removing carbon dioxide from the chamber air for a 10-day period, and we also brought on-line a catalytic oxidation unit as the water post-processor polishing unit, instead of an ion exchange-based system." These changes were planned in order to investigate alternate technologies for advanced life support systems.

The crew reports that the scientific experiments being conducted in the chamber continue to go well, including a five day period where all food and fluids consumed by each crew member had to be weighed. "Imagine having to weigh each component of your salad, including the dressing, and then having to weigh anything you had remaining on your plate at the end of the meal," Packham said. "The incentive to clean your plate is pretty strong."

The test team celebrated 60 days in the chamber at 9 a.m. Tuesday, Nov. 18, breaking the chamber duration record set by the last test team during the Phase IIA test in March of this year. At that time, Terry Tri, the commander of the Phase IIA crew, together with the remaining three crew members, officially handed over the keys to the chamber to the Phase III team.

As always, the test can be visited on-line at <http://pet.jsc.nasa.gov>.



Marybeth Edeen, Lunar Mars Life Support Test Project Phase III project engineer, cuts a cake marking the halfway point in the crew's 90-day chamber stay as JSC Director George Abbey applauds the team's effort in Bldg. 7.